Developing Conceptual and Procedural Knowledge/Skills of Lifelong Learners from Basic to Advance Learning: Exemplars, Challenges and Future Direction

ABSTRACT

Developing conceptual and procedural knowledge or skills of learners is 'part and parcel' of the roles of educators involved in teaching science and social science subjects. This article aims to espouse numerous educational reforms implemented locally, regionally, and internationally during the past decades, with exemplars and challenges elaborated. The mixed-method approach is selected as a research framework that includes the collection of qualitative data (mainly from documentary analysis, interviews, observation, and open-ended responses) and quantitative data (mainly from survey questionnaires). This article reports mainly qualitative findings that are summarized from mixed modes of analysis on data collected through systematic review and 'multiple-case design', including 'cross-case and within-case analysis' on how conceptual and procedural knowledge and skills of learners could be enhanced through the implementation of various technology-integrated project based programmes incorporating various effective strategies anchored on hybrid approaches in replacement of traditional methods. Case exemplars are illustrated with how these programmes serve as platforms for basic education and foundation courses from basic to advanced learning among lifelong learners. The analysis of a local programme to promote Year 4 students' (N = 33) primary science learning using the 5E constructivist model revealed that students were mentally engaged in learning science concepts, interacting with new experiences, and able to correct misconceptions with enhanced conceptual and procedural knowledge and skills on the taught topics 'Scientific Skills, Life Processes of Humans, and Properties of Materials' as reflected in their increased mean scores of science achievement analysed statistically. The implementation of the 'Learning Science and Mathematics Together' (LeSMaT) student-centered regional learning programme that provided a guide for expected project output is also illustrated with an exemplar of how learners' conceptual and procedural knowledge and skills in 'environmental education' were enhanced through the preparation of the project required for this program. The analysis of social science learning involving building foundation knowledge in economics through an international research-based internship programme revealed that students' conceptual and procedural knowledge and skills in 'economics 'were enhanced with the input on research methodology and the need to produce a report, which tied in with theories and the experience of their placements in various business settings that provided real-life experience related to economic issues faced during the pandemic.

In the end, the significance and implications of the study are discussed with ideas for how to move forward.